Official Papers.

DEPARTMENT OF STATE,
20th April, 1825.

The following communication from Mr. HUSKISSON, President of the Board of Trade in England, to Mr. RUSH, our Minister there, is published for the information of the concerned:

Mr. Huskisson to Mr. Rush.

Great George-street, 4th March, 1825.

DEAR SIR: I have the pleasure to send you, herewith, answers to the two queries contained in your letter of the 15th ult. Directions will be given to our Custom-house Officers in the West-Indies, and in our North-American Colonies, to treat American vessels, having only passengers and baggage on board, as vessels in ballast.

I have the honor to remain, dear Sir, your most faithful humble servant,

WM. HUSKISSON.

RICHARD RUSH, Esq. &c. &c. &c.

QUERIES.

Is a Steam-Boat of the United States arriving at a British Colonial Port, say St. Johns, New Brunswick, with passengers and their baggage only, liable to tonnage duty?

Is a Vessel of the United States, so arriving in ballast only, liable to tonnage duty?

ANSWERS.

The duty is imposed on vessels of the United States arriving with articles the produce of the United States. Vessels in ballast are therefore not liable to duty. Vessels having passengers and their baggage only, are here [in England] deemed to be in ballast. The practice in the West Indies is not known here, neither can any instance be traced of a Vessel not having any Cargo; therefore, if such passenger-vessels are employed, it is probable that they are considered as laden.

PIRATES CAPTURED.

U. S. SCHOONER SHARK,
Thompson's Island, April 3, 1825.

SIR: The enclosed report from Lieut. Comdt. Isaac M'Keever, of the U. S. steam galliot Sea Gull, which I have the honour to transmit, gives an account of the successful result of an expedition on which I had sent that vessel, with the barge Gallinipper, on the 20th ultimo.

On the 21st ult. Lieut. M'Keever fell in with a party sent by Capt. Mande, of H. B. M. frigate Dartmouth, for a similar purpose, and, having made an arrangement to act in concert, they, thus united, proceeded to the accomplishment of their object, viz. the capture or destruction of a piratical schooner and boat, which I had been confidently informed had committed a piracy but a short time before, and was then equipping for another cruise.

Although the schooner when captured, had on board a paper, professing to be a license for her as a cruiser on the coast, yet from the want of the Captain General of Cuba's signature, or that of the General of the Marine, to this document, her complete state of preparation for action, the training of her guns on the boats as they approached, the abortive attempts to fire on them, several times repeated, the actual commencement of a fire of musketry, and the quantity of American property found on board and in their lurking places on shore, with the erasure of all the marks by which either its owners or the vessels in which it had been embarked could be ascertained, I have not the least doubt of her piratical character.

The vessel and a boat which was the next day captured, (all the crew of which escaped on shore,)

were, on the 30th ult., lost, in a violent squall, on the beach. I have directed the prisoners to be sent to Havana, there to be delivered up to his Excellency the Captain General, with all the papers which were found, and a succinct account of the circumstances attending the capture.

Before closing this, I must be allowed to express the great satisfaction I feel at the destruction of these vessels, and the capture of so many persons prepared to prey upon the commerce, and sport with the lives of our unprotected fellow-countrymen engaged in the pursuit of a lawful and peaceable occupation.

To Lieut M'Keever, and the officers and crew of the Sea Gull, great credit is due for their constant and unremitted exertions, in defiance of fatigue and hunger. The ability of the first named officer has been conspicuously displayed on this occasion; and we are under no small obligation to Lieut. Ward, the the officers and men of H. B. M. ship Dartmouth, for their efficient co-operation, and their strenuous endeavours to effect our common object.

Nineteen prisoners have been brought in, of whom six are wounded. Eight or ten were killed, and the remainder escaped to the shore, where they effectually concealed themselves from pursuit.

I am, with great respect, your obedient and very humble servant, L. WARRINGTON.

HON. SECRETARY OF THE NAVY.

U. S. Steam Galliot Sea Gull,
Thompson's Island, April 1, 1825.

SIR: I have the honour to give you a detailed account of the late cruise, on which I sailed from Matanzas immediately after the reception of your orders of the 19th ult. taking with me the barge Gallinipper.

At Stone Key, I met His B. M. ship Dartmouth, under the command of the Hon. Capt. Mande; and was informed by him, that some of his boats were then cruising to windward in company with H. B. M. schooners Union and Lion. Continued our course, and fell in with them the next evening at Cadiz Bay. As they were also in search of pirates, but without any particular or certain information of their haunts, of which I was possessed, I deemed it proper to propose a co-operation, it being perfectly understood that I was to have the conducting of the enterprise. This proposition was cheerfully acceeded to: and requesting that the schooners should not leave Cadiz Bay to go to windward within three days, I left the Sea Gull under charge of Lieut. Rudd, and took with me, independent of the barge, which was well manned, two small cutters, with five men in each; and, in company with a British barge and two cutters, under charge of Lieut. Ward, of the Dartmouth, we made the westernmost point of the entrance of Sagua La Grande, where we were detained 48 hours, in consequence of strong head winds. The day after we arrived there, our water being nearly expended, the British barge and Gallinipper, Lieut. Cunningham, sailed in quest of some, although it was blowing a heavy gale from the eastward; and on the evening of the same day, the Gallinipper was capsized in a squall; but, with the assistance of Lt. Ward, and his crew, our officers and men were saved, and the vessel righted; she rejoined me, with the intelligence of the accident, a few hours after it happened, having lost part of her arms, ammunition, and provisions.—Notwithstanding this very serious misfortune, after pledging myself to procure provisions, we determined not to abandon the pursuit of our object but upon the very last extremity. Accordingly, the next morning, the 25th ult. the wind abating, we made another effort, and gained the mouth of the river Sagua la Grande about noon. At this place I found a fisherman, and compelled him, much against his inclination, to pilot us to the Key of Jutia Gorda, one of the places of our destination, and at about 4, P. M. descried the masts of a vessel, laying nearly concealed by the bushes, under said Key. We immediately pushed for her, and when we approached within hail, she hoisted Spanish colours, and ordered us to keep off, or she would fire into us, having her guns trained, and matches lighted, with which they made several ineffectual attempts to fire the

gun pointed upon the advancing boat. The channel being very crooked and narrow, the boats grounded several times. At length one of the British cutters succeeded in passing the bar; and as two boats abreast could not approach, the officers and crews of the others were ordered to jump overboard and wade to the shore, where, taking a commanding position on the bank of the inlet in which she was anchored, and within twenty yards of her, I ordered her commander instantly to come on shore, and not fire at his peril. After much hesitation, and reiterated threats to fire upon us, he obeyed. By this time every one on board was in great confusion. Instead of coming to me, he and a man who had accompanied him, attempted to make their escape. The commander, however, was seized, but his companion fled to the Mangrove bushes. I now directed him to order his colours to be hauled down, and to surrender his vessel and crew. He did order his colours to be struck, but at the same moment a musket or pistol was fired at the cutter, then close alongside, which was immediately returned, and a general fire ensued. The leader of the band, availing himself of the confusion, attempted flight. I fired at him, and wounded him; he fell—but rising very soon, and attempting to fight his way through our men with a long knife, he received several other wounds, and was retaken. Many of the pirates, in endeavouring to make their escape, by jumping overboard, to gain the Mangrove bushes, were shot; whilst others, seeing no chance of escape, were driven below by the boarders and musketry from shore. On taking possession of her, she proved to be a schooner, mounting two six-pounders, on pivots; four large swivels, and several blunderbusses; and completely equipped for a complement of 35 men, which was the least number she could have had on board, as we took 19 prisoners, and can account for 8 killed. Several effected their escape into the Mangrove bushes; and we are induced to believe that others were killed, whose bodies are supposed to have floated out to sea, unobserved, as there was a strong ebb tide. Among the prisoners are six wounded, one of whom is their Chief, and calls himself Antonio Ripol. We were fortunate in having but one man wounded, a British marine, who received a slight cut in the arm.

After securing the prisoners, we searched the schooner, and discovered that with the evident intention of blowing us up, they had placed lighted cigars in and near the magazine, which were soon carefully removed. We also found many articles on board of American produce, (and, to all appearances, but recently taken,) as the cases were quite new and clean, New-York hats, shoes, flour, rice, cheese, butter, lard. &c. &c; and to confirm their character, if there had been the least shadow of doubt remaining, we found the counterpart of these articles concealed in a thicket about twenty yards from the vessel, which was approached by a meandering path, and could only be discovered by careful search, so cautious were they in their operations.

The following morning, at daylight, Lieutenant Ward and myself took with us three boats, and proceeded to windward, leaving Lieutenant Cunningham in charge of the prize, prisoners, &c. We soon after discovered a large schooner-rigged "Regla Boat;" gave chase, and at 11 A. M. the crew finding we were gaining fast upon them, made for the nearest Mangrove Island, jumped overboard, and effected a precipitate retreat to the bushes, leaving every thing standing, with a keg of gunpowder, open, near the galley-fire, and quantities of it strewed over the vessel. The powder was instantly thrown overboard, and the fire extinguished.—She proved to be the boat whose crew murdered the five men belonging to the American brig Betsey, that was wrecked on the Double Headed Shot Key, in December last. After a long and ineffectual search among the mangrove bushes, for the fugitives, we took the boat in charge, and pushed on to the Key la Cosimera, whence they sailed from in the morning, being their place of resort and establishment. This we burnt, and returned to Jutia Gorda, at midnight; the officers and men being nearly exhausted: the latter having been at their oars from daybreak.

The schooner and boats being laden with the property found secreted in the woods and elsewhere, we set fire to the buildings on the Key, consisting of two very large huts and some outhouses. At this place was an old man, of more genteel appearance than the rest,

whose situation was so suspicious, that I thought proper to bring him with me. I have since discovered that he is the commandant of Sagua la Grande, and in some way intimately connected with these pirates: his papers I transmit to you, separate from those found on board the vessel.

Having distributed the prisoners on board the different boats, we got underway, together with the prizes, and sailed for Sagua la Grande, where, according to previous arrangement, we met his Majesty's schooner Lion, Lieut. Liardet, commanding, who politely offered to receive the prisoners on board his vessel, to relieve us of the inconvenience of having them in deeply laden boats, and they were accordingly removed. We now continued our route to Cadiz Bay, rejoined his Majesty's schooner Union, and this vessel reached Key Mona in company, on the evening of the 29th ult. where we found the Dartmouth still at anchor. Captain Mande, when informed of the capture in which his boats had assisted, expressed a strong desire to communicate with you previous to the prisoners being disposed of for trial. I, in consequence, repaired to Matanzas, to inform you of his wish; but finding that you had sailed for this place, I instantly returned to the Dartmouth, and made application for the prisoners, upon which they were removed to this vessel.

I regret to have to add, that in a heavy squall, on the evening of the 30th, the prize schooner parted both her cables; and having the "Regla Boat" in tow, they were both driven ashore on Stone Key, and bilged. The property, however, was taken out the same night, and the greater part of it saved by the united efforts of His Majesty's schrs. Union and Lyon, and this vessel: after which the wrecks were fired.

The handsome manner in which we were seconded by the officers and crew of the boats of His Majesty's Ship Dartmouth, merits our highest approbation; nor can I in justice omit mentioning the ceherfulness and alacrity with which Lieuts. Cunningham and Engle, Doct. Dubarry, and Mr. Barron (Secretary,) and the men throughout, performed their several duties, manifesting a degree of enterprise and zeal, amidst all their privations and fatigues, highly creditable to them.

I have the honour to be, with the highest consideration and respect, sir, your obedient servant,

J. McKEEVER.

To Com. LEWIS WARRINGTON, Commd. U S. Naval Forces in the West Indies, &c. &c. &c.

U. S. SCHOONER GRAMPUS,
St. Thomas, 12th March, 1825.

SIR: I have the honor to report, for the information of the Department, that having learned that several vessels had been robbed by Pirates near Foxardo, and that two sloops of this place, and one of Santa Cruz, had been taken by them, and two of them were equipped and cruising as Pirates, I obtained two small sloops at this place, free of expense, by the very cordial co-operation of his Excellency, Governor Von Scholten, of St. Thomas, who promptly ordered the necessary documents to be issued, and imposed a temporary embargo, to prevent the transmission of intelligence to the Pirates, which sloops I manned and armed under the command of Lieutenants Pendergrast and Wilson, for the purpose of examining all the small harbors of Crab Island, and the South Coast of Porto Rico.—We sailed on the first of March, and examined every place as far to the westward as Ponce, without success, although we got frequent information of them. We anchored at Ponce, on the evening of the 3d, and took our men and officers on board: the next morning, at 10 o'clock, a sloop was seen off the harbour, beating to the eastward, which was very confidently supposed to be one of those fitted out by the pirates. I again got one of the sloops, and manned her under the command of Lieutenant Pendergrast, accompanied by acting-lieutenant Magruder, Doctor Biddle, and Midshipman Stone, with twenty-three men, who sailed in pursuit the next day, at 3 o'clock. They had the good fortune to fall in with her in the harbor of "Boca del Infierno," which is very large, and has many hiding places,

where an action commenced, which lasted forty-five minutes, when the pirates ran their sloop on shore, and jumped overboard: two of them were found killed, and ten of those which escaped to the shore were taken by the Spanish soldiers, five or six of whom were wounded, and amongst them, the famous piratical chief Cofrecinas, who has long been the terror of the coast, and the rallying point of the pirates in this vicinity. As near as we can ascertain, he had fifteen or sixteen men on board, and was armed with one four pounder, and muskets, pistols, cutlasses, and knives, for his men. The sloop was got off, and arrived safe, with our tender, at this place, last evening; and I am happy to add, that none of our people received any injury, and all have returned in good health, nowithstanding their exposure to the sun and rain, for eleven days, without the possibility of getting below. I have much pleasure in stating to you, that I received every assistance from the authorities of Ponce, whilst there, and that they showed every desire to promote the success of the expedition. I have the honor to enclose you a copy of a letter sent by them to Lieutenant Pendergrast, thanking him, the other officers and men, for the service rendered the country, in the capture of the Pirate.

The success of the enterprise, against skilful and cunning adversaries, is the best proof I can offer you of the good conduct of the officers and men engaged in it, and renders superfluous any eulogium from me.

I have the honor to be, sir, very respectfully, your obedient servant, JOHN D. SLOAT.

Hon. SAM. L. SOUTHARD, Secretary of the Navy, Washington.

To Lieutenant Pendergrast, the Officers and Crew of the sloop Dolphin, now in the service of the United States of America:

The Alcade of Ponce, Don Jose Torrens, and the Military Commandant, Col. Don Tomas Renovals, request me to say to you, that, in the name of the Governor of this Island, and of the Spanish Nation, they present you their thanks for the important service you have rendered them, in capturing the piratical vessel commanded by the noted Cofrecinas.

They have written to the chief authority an account of your gallant and successful expedition, and hope your future exertions may meet with equal success.

In them you will always find friends and brother officers in an honorable cause, and all the assistance they may have in their power.

They request you to accept the refreshments now sent off, and regret that your short stay deprives them of the pleasure of showing you more particular attention.

They are also happy to say that Captain Manuel Marcann has also been successful in securing some of the pirates who swam to the shore after you captured their vessels.

Wishing you success, health, &c., I am, gentlemen, your friend and servant,

JAMES J. ATKINSON.

Ponce, 5th March, 1825.

U. S. SCHOONER GRAMPUS,
St. Thomas, 19th March, 1825.

SIR: On the 12th of this month I had the honor to report the capture of a Piratical Vessel on the South side of Porto Rico, by an expedition fitted out from this Vessel, and her safe arrival at this place; also my having given her over to the Governor to be returned to her former owner, an inhabitant of St. Thomas. I subsequently learned that the Pirates who swam on shore had been taken and sent to the City of St. Johns, the seat of government of Porto Rico; at which place I called to offer our testimony against them. Enclosure No. 1, is my letter to the Captain General; No. 2, his reply, which I have forwarded for the information of the Department. Our testimony was not required, as they have confessed sufficient to convict them.

The capture of this vessel, I find, is considered of much more importance, by the governments of Porto Rico, St. Croix, and St. Thomas, than I had any idea of, as the leader, "Cofrecinas," has for years been the terror of this vicinity; and his career has been marked by the most horrible murders and piracies; and for some time a large reward has been offered by the government of Porto Rico for his head. Although wounded when he got on shore, he would not surrender until he received the contents of a blunderbuss, which shattered his left arm, and he was brought to the ground with the butt of it. I have seen him in prison; and he declares that he has not robbed any American vessel for the last eighteen months, only, however, for want of an opportunity. Several persons on shore, heretofore considered respectable, have been arrested as accomplices of this gang. Six of them were brought to St. Johns and committed to prison whilst I was there. The Captain General has promised me that these desperadoes shall have summary justice—that he will not wait for the civil court, but will order a court-martial immediately to try them.

I have great pleasure in stating to you that the Captain General appeared to have every disposition to prevent all piracies from the coast of Porto Rico, and to co-operate with me by all the means in his power; and for which purpose he gave me a circular letter to all Civil and Military Officers on the coast, requiring them to give me every assistance and information in their power whenever the Grampus or her boats may make their appearance on the coast or in any of the harbours of the Island; a copy of which is enclosed, No. 3.

I have also the honour to enclose you a note from me to Governor Van Scholten of St. Thomas, No. 4, requesting him to give the necessary orders to receive the Sloop, and to have her restored to her original owner, and his reply, No. 5. Also a letter from James J. Atkinson, Esq. in behalf of the Alcalde and Military Commandant of Ponce, No. 6.

When I left St. Johns, the Fiscal was taking the declaration of Cofrecinas; and the Captain General promised me a copy of it; but having a large convoy to take to sea on Sunday, (to-morrow) from this place, I could not wait for it: it will be sent to me in a few days, when I shall send it to you for the information of the government, as I have no doubt it will throw much light on the subject of Piracies,

I have the honour to be, very respectfully Sir, your obedient servant, JOHN D. SLOAT.

To the Hon. SAMUEL L. SOUTHARD, Secretary of the Navy, Washington.

(No. 1.)

U. S. SCHOONER GRAMPUS,
St. Johns, Porto Rico, 14th March, 1825.

SIR: I have the honour to inform your Excellency that I have arrived in this harbour, with the United States schooner Grampus under my command. The object of my visit at this time, is to inform your Excellency that a small sloop, a tender to this vessel, met with a piratical sloop in the harbour of "Boca del Inferno," under the command of the famous piratical chief Cofrecinas, on the fifth day of the present month; and after a desperate resistance, drove her on shore. The pirates that were not killed jumped overboard, and got on shore, where ten of them, I understand, have been taken by the troops in that vicinity, and sent to this place. Should your Excellency consider the testimony of the officers of the Grampus at all necessary in bringing those enemies of mankind to justice, it will be cheerfully afforded. The

sloop I took to St. Thomas, and gave her to her former owner.

I have the honour to be, with the greatest respect, your Excellency's most obedient servant,

JOHN D. SLOAT.

To his Excellency, J. D. Miguel de la Torre, Captain General of the Island of Porto Rico.

No. 2.

[TRANSLATION.]

Government and Captain Generalship of the Island of Porto-Rico.

I have received the official letter which you were pleased to direct to me, under date of 14th ult. informing me of the object of your visit to this port, and offering, if necessary, the declarations of your officers and crew, (who fought with so much bravery against the pirates in the Boca de Infierno,) in case they should be found necessary for the conviction of those criminals, in the process instituted against them by this Captain Generalship. I return you my most grateful thanks, as well for this offer as for the effectual assistance you have rendered in the pursuit and capture of these wicked wretches, of which good services I was already informed by the Military Commandant, and other authorities of Ponce. Be pleased to accept the tender of my acknowledgments, and also to be the organ of communicating them to the officers and crew of the schooner under your command, for their co-operation, which confers so much honour on the Navy of the United States; and, as regards their declaration, (considering that the pirates do not deny the principal facts, and that they have already convicted themselves,) I do not think it necessary to put them to the inconvenience you were pleased to offer, and which goodness would have been accepted, had it been found necessary. This Captain Generalship, in rendering to you its acknowledgments, flatters itself that you will be pleased to continue your good services in the pursuit of this scourge of humanity; that, in case there should still be any remaining, they may be brought to suffer the condign punishment which their captured comrades will not fail to receive. To effect this, the most energetic orders have been issued, that all the authorities of the coasts should hold themselves unanimously in readiness to co-operate with you in the most efficacious manner for the attainment of this result.

Accept, Senor Commandant, the assurance of my respect, and of the consideration with which I pray God to preserve you many years.

MIGUEL DE LA TORRES.

Puerto Rico, 17th March, 1825.

To the Commander of the U. S. sch'r Grampus, in the Bay.

No. 3.—[TRANSLATION.]

The Captain of the U. S. American schooner Grampus, (Lieut. John D. Sloat,) goes in pursuit of pirates; for which purpose he will visit all the ports, harbours, roads, and anchorages, which he may find convenient. In consequence, you will give him all the necessary aid and notice for discovering them; and in case of meeting with them, the authorities of the coast, both civil and military, will join themselves unanimously with the said commandant, to pursue them by land, while he does the same by sea; and in case any of those wicked wretches should seek refuge in the territory of any part of the Island, they will pursue them briskly, until they have possessed themselves of their persons. The Government expects, from the known zeal of the authorities referred to, that they will display the greatest activity, efficacy, and energy, in this important service, assuring each, in particular, of the lively interest which it feels for the total extermination of such vile rabble, the disgrace of humanity. Those who shall distinguish themselves in

the opinion of the Government, will be reported to his Majesty, giving to each one justice, according to his merits. God guard you many years.

MIGUEL DE LA TORRES.

Puerto Rico, 16th March, 1825.

To the Military Commandants, and of the Quarters, Royal Alcalda, and other Civil and Mil. Authorities and Functionaries of the Coasts of this Island.

No. 4.

U. S. Schooner Grampus, *St. Thomas, 12th March*, 1825, 8 A. M.

Sir: Having been informed by the Captain of a vessel that arrived in this port, that the piratical vessel which the Danish man of war and myself had for some time been in search of, was in the vicinity of Crab Island, and had captured and plundered several small vessels belonging to this place, and no Danish man of war being at the moment in port, I did not hesitate to request of your Excellencys permission for the three Danish sloops (whose Captains had volunteered their services) to assist me in pursuit of her. Your Excellency immediately granted the request, on the sole condition that I should pledge myself, as an officer and gentleman, that the vessels should not be used for any other purpose than searching for pirates. I can assure your Excellency that they have been used by me for no other. The sloop which arrived this morning is the last of the three which were under the command of Lieut. Pendergrast, who was so fortunate as to fall in with, and capture, the piratical vessel we have been so long in search of, commanded by the famous chief Cofrecina who is badly wounded; the most of his crew were killed or wounded, and the Survivors are, all I believe, now prisoners in Porto Rico, where the Government afforded every assistance to the expedition whilst on that coast, and uncapturing those that swam on shore. I herewith return your Excellency the documents placed by you in my hands to be used by the sloops engaged in the expedition. I cannot forbear to recommend to your Excellency Capt. Perrelty, master and owner of the Danish sloop Dolphin, who rendered great assistance by his knowledge of the coast, and his good conduct during the cruise, and whom I beg leave to recommend to your particular notice. I have great pleasure in restoring to the rightful owner the sloop captured from the pirates, and request your Excellency to give the necessary orders to have her delivered to him. I also enclose several sets of Danish papers taken on board the piratical vessel.

I have the honour to be, with great consideration and respect, your Excellency's most obedient servant,

JOHN D. SLOAT.

To his Excellency Gov. Von Scholten, of St. Thomas, St. Johns, &c. &c.

No. 5.

Government House, *St. Thomas, 12th March*, 1825.

Sir: I have the honour to acknowledge the receipt of your letter of this instant, and am extremely happy at the successful result of the expedition.

I shall take a pleasure to lay your communication before my government, and beg you will be assured how much the community and I feel obligated to you for the assistance you on every occasion so readily afford this Island.

I have the honour to remain, Sir, your most obedient servant,

P. SCHOLTEN.

To Lieut. Com't. Sloat, Commanding the U. S. Schooner Grampus.

No. 6.

Ponce, 12th March, 1825.

To Captain J. D. Sloat, United States Navy:

Dear Sir: I have the pleasure of communicating to you the agreeable information, (at the request of Col. Renovales,) that Chief of the pirate you saw passing in front of this port, and in pursuit of whom you despatched the expedition under the command of Lieutenant Pendergrast, has been captured, with twelve of his associates, on shore, near Guayama, all desperately, if not mortally, wounded, particularly the leader, Cofrecinas, who landed, wounded, and then fought Capt. Marcanos, until he had three bullet, and two sabre wounds. He cannot survive.

The Commandant and Alcade present you their sincere and warm thanks for the service and aid you have rendered this place in capturing this pirate, and wish to be remembered to yourself, Lieutenant Pendergrast, and the other officers of your expedition. They wish soon again to see you, and hope you will remain in port long enough for them to show you some particular attention.

Many of Cofrecinas's confederates on shore are arrested: five from here sent to St. Johns.

Your friend and servant,

JAMES J. ATKINSON.

REPORT OF THE BOARD OF INTERNAL IMPROVEMENT.

Message from the President of the United States transmitting a report of the examination which has been made by the Board of Engineers, with a view to internal improvement, &c.

(Continued.)

This quantity appears to be treble that required, nor have we included those reserves which might be formed on the Deep Creek and Glades; nor that of which the Pine Swamp, west of the Youghiogeny, may be capable; nor which might possibly be formed by a dam 90 feet high, above the Great Falls.

The four first are the most practicable, and they would have a feeder of about 16 miles in length.

It is not to be denied, in practice, that the principles which should govern the construction of *feeders* are in some obscurity: with the utmost precaution they have sometimes disappointed expectation. That of St. Prive, on the canal De Briare, is eleven miles in length, and it lost three fourths of the water that entered it, although the feeder was rebuilt with every possible precaution, *except covering* it. The usual section of the stream at the entrance gate was five feet broad and 2 feet deep: the gate where the feeder discharged into the summit level, is 3 feet 4, and the water 7 inches deep. The slope of this feeder was 5½ inches per mile. The quantity of water received into the feeders of Languedoc canal, is 72,000,000 metres; of which 37,256,000 is discharged into the canal, and 35,344,000 is lost by filtration and evaporation. Without attempting either to account for this loss, or for the fact that feeders, of comparatively small dimensions, appear to lose as much as canals, the conjecture may be hazarded that the shallowness of the water permits its temperature to be raised—its velocity increases by exposure to the air, and the more so if the wind is against the current: the absence of hydrostatic pressure on the banks, as the volume diminishes, allows them to become more dry and absorbent. These concurrent causes may account for the disappearance of this large proportion, and may suggest, besides the expedient of covering them from the sun, others by which they may be adapted to our climate.

The construction of dams of great elevation, though by no means impracticable, are not only attended with expense and difficulty, but with some uncertainty. That of the St. Ferreol reservoir of Languedoc, is 110 feet in height; in masonry, parallel walls of great thickness, filled between with earth. But it is stated, as the result of experience in dams of masonry, that they are found too

often to require repairs. In Scotland, preference is given to building a puddle wall in the centre of an embankment. There is one of this kind, 90 feet high, at Glencorreburn, near Edingburg. In building them, the course of the stream must be diverted. Puddle is any tenacious earth, compacted under water, by which the air is excluded from it —the particles of the mass are afterwards kept in contact by the weight of the atmosphere.

The uncertainty of success arises principally from the hydrostatic pressure, in any deep artificial water, which sometimes occasions small leaks secretly to spring out, perhaps through fissures of the rock, if on limestone; or, by the porosity of the earth, discharging much water by small and imperceptible openings. Reservoirs are, of course, experimental, in proportion to their magnitude; but most likely to succeed where the ground has been occasionally or annually flowed.

We have shown that the loss by evaporation more than rain, may, in summer, be one foot. Du Cros, (a writer on these subjects,) states the absorption on canals to be one and a half times the evaporation. In this ratio, we must allow for a reservoir, were it of the same depth only; according to the tables for the summer season, 31.45 inches plus 15.77, but as a drought for sixty days would be so extraordinary as to preclude the navigation of the western rivers—we may safely assume the results of Dalton's experiments, which were 12 inches for sixty days, and allow the filtration to be 2 feet. This addition has been therefore made on the elevations of the dams.

It has been shown, that, by these means and methods, there may be water enough for the *longest*, but *lowest* line.

The next inquiry is, whether there is water enough at command for the shortest line, 29 miles, described page 15.

This line is higher than the former by 34 feet, viz: 10 feet above the base line of Deep Creek, occasioned by ascending to the Bench mark near the mouth of Meadow Mountain Run, and which increased elevation is necessary to be out of reach of the freshets of Deep creek, which rise at the bridge, at least 9 feet.

As the canal must be kept out of reach of floods, it may be supposed to be led along the foot of Meadow mountain, across Cherry-tree glade Run, and along the declivity of Negro mountain, and up the Buffaloe valley to the tunnel leading into Bear creek valley, which on this plan may be shortened, and, by somewhat deeper digging at both ends, reduced to about *one* mile.

The quantity required, in. 29 X 58.13 =	1,685.77
Lackage as before	2,250.00
per minute,	3,935.77
per second,	65.59
To supply this demand, we have Deep creek in its lowest state.	7,247
Quantity to be provided for, feet,	58,343

X 60 X 60 X 24 X 60 days,=309,346,560 cubic feet.

To provide for it we have,

1st. The summit level capable of a variation of three feet. Its length, measured from the eastern extremity of the east tunnel to the western extremity of the west tunnel, is 10 ms. 1.663 yds. of which 4 ms. 1,333 yds. may be 15 feet wide, 376,785

5 ms. 1,100 yds. may be 40 feet wide 188,000

feet,	1,564.785
Multiplied by 3,	3
	4,692,355

The Glade reservoir may be formed by a dam at the narrows, 200 feet wide, 12 feet high, plus foundation. This would flow the water to Elk Lick, on the foot of the Dividing ridge, which is, feet, 26.194 above base and

	m.	d.	p.
	4	42	32
Because *less* to Meadow mountain, feet 14,844 distance,	2	13	37
Shows the dam to be 11,750 the distance,	2	28	95

The area would be about 2¼ miles plus 1 mile up South fork, plus ¾ up North glade or 4 X ¼ is 27,878,400, 6 feet deep available 167,270,400

To this we may add a reservoir higher on the South fork; another higher on the North glade, another on Meadow Mountain Run about the entrance to the tunnel, and on the high glade of Cherrytree; these require no extent of feeders, and a moderate extent and elevation of dam. These may be considered as at least equal to one square mile 6 feet deep, or, 167,270,400, which, added to the preceding sums, is 339,233,155.

Recollecting that we are providing for a *drought of sixty days*, which has never been known on these mountains, this may be admitted as sufficient —but, in truth, we have assumed large size locks, and constant operation of them. But it may appear inexpedient that they should be *so large*, and still they are two other sources of supply, attended with some expense. These are—First, to bring into the glade reservoir the waters of the upper branches of the little Youghiogeny, Nest Lick, and Wolf Runs, (the minimum delivery of which, appears to have been, feet 8,746,) by means of a duct through the intervening hill, the distance through, being three *miles*, and connected with this, might be a feeder to the Cherrytree fork, which affords 11,503, these added 1,728,000, and reach the best situation for reservoirs on all the upper branches of the Youghiogeny.

To these may be added the Pearl Run and Pine Swamp reservoir, which may, (according to Mr. Shriver's Memoir and survey,) be of several square miles extent, confined by a dam of small dimensions. But this must be attained by means of an aqueduct feeder, and the use of some extent of iron pipe. This is not difficult, but the ground has not been examined with this view; the elevation is, however, considerably above the base line, and the line under discussion. But we may leave the resources of the west side of the river in reserve for the western section.

It remains to elucidate the circumstances of the line with the *shortest tunnel*, viz: the 9th line. This line passing from Dry Arm to Deep creek, it is probable the tunnel may be shortened to *one mile*—passing down the glade to the narrows, it thence will follow, as before described, the course to Bear creek valley. The glade was examined and found to have a soil of about four feet deep, based on rock, probably like that of the adjacent ridges, sandstone in strata. If excavation were to commence 4 feet deep at North glade, which was found to be 17.794, then minus 4, is 13.794. The mouth of Elk Lick opposite Dry Arm 27.194, above base, also minus 4 = 22.194 less 13.794 = feet 8.400, the depth of digging in rock diminishing westward to 0. In forming a canal through the glade, it will, no doubt, be necessary to employ considerable force in pumping; perhaps the cheapest power is the steam engine, where fuel is cheap.

The summit level would occupy the place of one of the glade reservoirs before described, and must be made to have the properties of one. The others will be conditionally adequate.

This line is one mile longer than the shortest; but besides that, the tunnel is but about one mile. Should increase of business on the canal render it expedient, a second tunnel of the same length might be made, not far from the first, into Dewieckman's arm; and two, or a *wide one*, will be necessary. The inconvenience of *narrow tunnels* in causing delay is thus exemplified: if it be one mile through, and boats can pass in half an hour, and are entering half an hour, others wait an hour for their turn, which is six hours a day, and which diminishes the power of the canal, considered as a machine, one half. In an active trade the tunnel may be as well the gauge of all the rest of the canal, and a great saving of cost take place.

In this country, where so many are doing business on their own account, delay and hindrance ill accords with the industrious, persevering genius of the people; hindrance also occurs where a canal, being led through rock, is made narrow; or where aqueducts are of single width, or the abutments of bridges are allowed to contract the trunk of the canal. It may be said, without hesitation, that a work like this in contemplation of the National Government, should be capable of *two processions of boats*, in opposite directions, from end to end; but the size of them should be adapted to the trade, and to the natural navigation which the canal connects together.

It thus appearing that the communication is practicable by the ordinary methods of supply, the natural flow and reserved bodies of water; the practical inquiry next occurs, whether the descent from the summit level each way, so much in so short a distance, affords room for the locks? From the east end of the tunnel, to the mouth of *Crabtree*, will be eight miles, the descent being 1,054 feet; it is 40 in length for one descent. A lock of 100 feet, eight feet lift, with its entrances, occupies 120 feet. Therefore, a succession of locks with intermediate basins of 200 feet, will occupy the whole ground. On the west side the descent is 960 feet in six miles, or 33 feet for one foot. It would indeed be very difficult to keep a canal in operation thus constructed; the reason is, that, in these successive basins, their depth, in relation to the entrances of the locks, is easily deranged. If a boat is going up, she checks the supply, and, at the same time, another draws from the source thus failing of supply: throughout one hundred and five locks, and as many basins, there would be an incessant fluctuation of this kind of trouble. To remedy it by a feeder along the whole way, parallel to the work, would involve the waste of water, did the ground permit; or, if the descent were made by a set of connected locks, four or six together, in order to extend the basins in this case to 1,000 feet, then occurs delay in passing, unless there are *parallel* series; and for this, I fear our ravine of 40 feet will hardly afford room.

There are indeed other methods of passing from one level of a canal to another; but it too often occurs that ingenuity is disappointed of fortunate results, from a want of that practical philosophy which would have enabled them to calculate the strength of materials, and the resistance of friction, in the movement of heavy bodies; and whenever improvements of this kind come from the hands of those who are known to be versed in mechanical science, such is the natural fondness of inventive genius for its own offspring, that machines for a public object must be subjected to the coolest test of principle, the most thorough investigation, and the judgment of practical minds.

The western section may have an interest, to depend in a degree on the reservoirs or the head branches of the Youghiogeny: we have not only to guard against the violence of floods, but the extreme of the opposite condition; and the utility of them is at once preceived in reviewing the circumstances of the two lines of this part of the route, for which the water must almost all go from the mountains, one hundred miles.

Besides those, there may be one by means of a dam at the head of the ravine of Winding Ridge. From hence, or from some lower point in this passage, a feeder may be led to the canal at the elevation required for the Laurel tunnel route; or if the line should be preferable down the course of the river, then others on Cassellman's and North Branches. Indeed these may, in either case, be wanted, as the two lines unite below the Laurel Mountain, and the supply must then be had from the Youghiogeny.

Finally. Having explained the whole subject, so far as the present state of information permits, my impression is, that, notwithstanding the (9th) line of the shortest tunnel is not the shortest canal, and the Deep Creek summit will be *thirty-four feet higher* than the circuitous line; nothwithstanding the route by *Bear Creek* will require a second tunnel, and the line away from the river a third tunnel, and a magnificent aqueduct, yet I give a decided preference to this whole route, as that which embraces the great points, directness, control and command of water, economy of expense, and continuity of operation, with most certainty. Both lines should be investigated thoroughly, as it is for posterity and perpetuity that this great work is to be accomplished.

In conclusion, a few general remarks may be offered, arising from the occasion and the position of the Board. No difficulty has been diminished or magnified. The obstacle to a communication by the Potomac route with the Western states, lessens to a point, compared with the magnitude of the object, whether in a commercial or political relation to the prosperity of the country. In Europe, their canals, even those of Governments, have all some definite limited object of utility. But here it is not alone the distance—the elevation—the vast natural navigation to be connected, which constitutes the grandeur of the design; but the immense interests it combines into an harmonious national whole.

Whoever visits the Western states for the first time, is astonished that so few years have elapsed, since this fertile and populous part of our country was a vast wilderness; but the surprise ceases with the recollection, that, at the establishment of the constitution, the United States became the owners of these lands, ceded and pledged by the states to each other, jointly and severally, as a basis of public credit, so broad and safe as to be an effectual guarantee against the oppression of an accumulating national debt, and therefore, the real wealth with which every thing for the common good may be accomplished. The immediate offer to sale of this fine body of land, in a mild climate, intersected by great and by small rivers, could not but induce the emigration of a youthful, brave, and resolute population, from every Atlantic state.

The provisions of the constitution were thus fulfilled; and in time, young states became partners with their old parents in the advantages of civil liberty. Money paid into the common treasury purchased a title to their farms; but they carried with them, or inherited a title to equal prosperity under that compact, which establishes power to provide for the general welfare.

This prosperity, it is clear, can be attained only when the geographical isolation of a large portion of the country shall cease, and avenues be opened to a participation, on equal terms, in the commerce of the world. From the Alleghany mountain to the Wabash, from the Tennessee to the Lakes, there is a great and valuable portion of the interior remote from every seaport, and intercepted by nearer, but not more fertile, regions from the accessible markets, especially in the early spring. Industry is indeed so depressed, that, notwithstanding the modern mode of navigation prevails largely,

produce is so low as to bear land carriage (by the National road) three hundred miles.

This section of our country comprehends one sixth of Virginia, one fourth of Pennsylvania, with the states of Ohio, Indiana, and Kentucky, containing eighty-five millions of acres, and at least one million six hundred thousand inhabitants. But not these only—all beyond them are interested in an ultimate system of internal communications, and all, too, on this side, since our internal prosperity is the support of our external commerce—our navigation, which cherishes our best means of preserving peace, by efficiency in war. The eight western states contain two hundred and forty-eight millions of acres, and at least two million five hundred thousand inhabitants. If the land may average five dollars an acre, its value is twelve hundred and forty millions of dollars, and to this may be superadded, the four territories containing seven hundred and eighty-six millions of acres, much of which is already likewise valuable. How small a percentage on this value would amount to the cost of all the internal improvements! How certainly good communications must double that value!

That these and other great results in contemplation of government, cannot be produced and secured by any single canal in execution or contemplation by the states which extend beyond the mountains, is demonstrable. Constructed by their citizens for themselves, if equal, when accomplished, to their accommodation only, they would surely have the best right. No compact, no duty prescribes that they should make and maintain commercial means of intercourse for the general welfare, or keep open such as they may have made, beyond the limits of their own interest. The states may take care of themselves; but the United States, of all. Hitherto, the business of the West had been thought essential to an income proportionate to the cost of public works of this kind; but this apprehension is dissipated by the success of Erie, thronged with navigation even before it has reached the Lake. And although the capacity of that canal for business may be increased by parallel locks, and other means, there are limitations to its power, set by the command of water it possesses. Ever since the commencement of that work, the western counties of New York have been increasing greatly in population, and there will be no necessity for business from Ohio and Michigan to ensure a competent revenue from Erie canal. The very facts which show the wisdom of that undertaking, prove that the Western states may find it pre-occupied. The nearest customers must always have the preference. They are in possession. Nor would a canal through Pennsylvania be less occupied. This state, besides being equally fertile, possesses iron and coal. She is favoured by nature with great rivers, whose courses converge to the canal route, and must, when effectuated, pour into it a great accession of transport.

It is evident, therefore, that the General Government has an interest in the success of the state Governments—in the effectual and extensive influence of their public works, with which its own co-operates to the same great end. To each it must be best that they should yield a fair income. The revenue is not all in the public good produced; those who use canals can well afford to pay tolls; they are benefited in a much higher ratio than that charge upon the increased value of the property transported; nor would it be just, in good policy, not to make the income, in time, not only secure the perpetuity of the way, but the interest on the investment, which it would most certainly do, at very moderate rates. If as many boats were to enter as has been assumed in the calculation of the water, it would be $5 \times 12 \times 2 = 120$. If twenty-five tons, then $120 \times 25 = 3000$ per day. If 200

days, 600,000 tons, at two cents a ton a mile, is 3,900,000 dollars, the canal being at least 326 miles.

Finally: in reviewing the whole ground, the Alleghany mountain stretching through the centre of the Union, so far from being a barrier to the most economical form of communication, is, in fact, to be rather considered the great laboratory of that element which is essential to this branch of the internal improvements in contemplation of the General Government.

The next division of this communication is in relation to the route of canal between the Ohio and Lake Erie, also respectfully submitted.

JOHN L. SULLIVAN,
Member Bd. Inter. Improvements.

Washington, February 3, 1825.

Reconnoisance of the country between the Ohio and the Lake.

While the investigations were proceeding on the summit ground, the Board made the reconnoisance of the country between the Ohio and Lake Erie, in order to designate the most suitable route for a communication between these waters.

The course of the Ohio river, from Pittsburg to the mouth of Big Beaver, is in a direction which approaches the Lake, and that point is found to be the most proximate. With the guidance of a gentleman well acquainted with the district, the Board, after examining the falls, ascended the valleys, diverging for some distance up the Shenango, which was subsequently visited along its upper branches. From Warren, at the head of the Big Beaver, where the branches called the Mahoning, and Silver creek, come in, excursions were made to all the points of essential interest to which our attention was drawn, either by the known topography of the country, or by facts ascertained under the authority of the adjoining states, or by gentlemen actuated by motives of public spirit.

The adjoining township of Champion being the highest ground between the Beaver and Grand river, had been ascertained to be *three hundred and forty-two feet* above Lake Erie, and *two hundred and eighteen feet* above the Ohio. It became, therefore, as this line has the lowest known summit, a very interesting inquiry, whether a sufficient command of water could be had to make this "the most suitable route," especially, as the gentle slope of the country through Rome, Austinburg, and Ashtabula, appeared to be favorable ground, and the valley of the Grand river, for some distance, afford advantages. An important fact had been ascertained by an engineer employed by the state of Ohio, viz. that the Cuyahoga could be led eastward, to the summit of Champion. The distance and elevation of that point, and the quantity of water at command, would therefore decide the practicability of a canal by this route.

We proceeded, therefore, to the Cuyahoga, and ascended to the rapids. At this time there had been no rain for three or four weeks. The opportunity was favorable to determine nearly the minimum quantity of flowing water. The section and velocity of the stream were taken at several places, and the mean of these operations and calculations was $56\frac{148}{1000}$.

We returned by the track which Mr. Geddes levelled, to the head of Silver Creek, where the greatest depth of cutting was ascertained to be seventeen feet, and the distance between one and two miles. We visited Garret's mill, on this stream, where it was found, that 6.070, was the quantity, per second, of flowing water: and at Parkman, a small stream, also, at command measured $1\frac{389}{1000}$ ft. together $63\frac{6}{10}$ being the whole of the natural supply at command above Champion; and it was the opinion of some of the inhabitants, that the Cuy-

ahoga was, at times, a quarter to a third lower than at present.

The length of feeder required, would be eighteen miles; the length of canal to be supplied from these sources, would be some distance down the Beaver, aided by the Mahoning, and fifty miles to the Lake; in the course of which it would cross some feeble streams from Bloomfield Swamp, perhaps low enough to receive them. Or, if the line were to descend into Grand river valley, it would be circuitous, and from Austinburg to Paynesville, under peculiar disadvantages, from the washed banks, or high bluffs of earth, along the foot of which this stream alternates by sweeps. The line could not leave the valley to attain a termination at Ashtabula.

When the question presented itself, Whether the canal route might not rather ascend to the Cuyahoga, and descend that valley, to Cleaveland, the first inquiry naturally was as to the elevation of the ground. Mr. Geddes had not levelled up the rapids, and we were left to infer its elevation from the other elevations which he measured, and partly from the conjectures of the inhabitants.

He began on the side of the small lake between the Muskingum and the bend of the Cuyahoga, 404 feet above Lake Erie. His line was run eastward beyond Ravenna, and the ground west of the Mahoning was found to be 149.20 feet above the starting point at the little lake. It was found that the narrow falls of Cuyahoga is forty-nine feet above that point, from whence to the rapids, (the place we visited,) the ascent is estimated at 120 feet, distance fifteen miles. Mr. Geddes continued his line of level from the high ground to Garret's mill, on Silver creek, found to be 58.80 feet below the starting point: continuing on, he found the swamp in Nelson to be 37.80.

and Champion below that 21.

58.80

As Champion is 58.80 below the point of departure, and the Narrow Falls 47 above it, and the fifteen miles ascent 120, as conjectured, Cuyahoga Rapid is 225.80 above Champion, and Champion is 342 above Lake Erie; therefore, 567.80 is the elevation of this line.

This is corroborated thus:

The starting point	404
To the Narrow Falls	47
To the Rapids	120
	571

It is true, the number 120 is conjectural: but as the people estimated the fall to be 150, it is set down at 120. To this discouragement might have been superadded the difficult nature of the ground down the Cuyahoga Valley, according to Mr. Geddes' report in print.

It is not our duty at this time to dwell on the advantages which Ohio may ultimately derive from local relations and elevations of the Cuyahoga. It may surely be the means of forming a useful canal eastward, if it cannot adequately supply a canal of the dimensions this communication, prospectively considered, will require.

Subsequently to these observations, the Board followed the line from Warren to Austinburg; thence to Paynesville and the mouth of Grand River.

Returning to Austinburg, we pursued the line proposed to Ashtabula, and viewed its harbor also; the next object was to view the summit ground between the head of the Ashtabula and the head of the Pymatuning, a branch of the Shenango; thence, to the head of that river, and down its valley, southward, to the junction of *Crooked Creek* branch, which was followed up, northward, to *Conneauti Lake*, which is separated from its head waters by rather low ground; thence, to lake Erie, descending 470 feet. From the north end Conneauti, the waters running into Erie are

separated by a ridge of 15 feet for a short distance. To the lake is 25 miles. To Erie Harbor nearly 40 miles. The nearest point on the Lake shore is at Elk Creek mouth, about 16 miles west of Erie Harbor. An artificial harbor might be securely built here; the bottom is rock, gradually declining from the shore.

To view the line near Waterford, the board, after visiting Erie, ascended to the sources of supply on French Creek. The elevation of this summit would be 670 feet near La Bœuf Lake.

Arrived at Meadville, we availed immediately of the long period of dry weather, to ascertain the minimum of flowing water in French Creek, which the Conneauti Lake route is capable of receiving. The operation of measuring it was repeated several times, and the means of these measurements found to be 230 cubic feet per second, which is considered to be abundant, especially as the plan of the work will probably include the waters of Conneauti Lake; and, if necessary at any future time, it may be raised, and make a reservoir of five miles in length, and nearly one in breadth, if found, on investigation, that it would fill.

This source of supply being the only one amply sufficient, would seem, of course, to prescribe the route nearest to it, as most suitable; and we saw no difficulty in making a canal from the mouth of Beaver to the mouth of Elk, in the distance of a little more than one hundred miles.

Having thus accomplished the reconnoissiance we divided our party, and Col. Totten descended the Alleghany to make a chart of that river, the distance from Franklin to Pittsburg being 109 miles, and there are 45 rapids in its course. On re-assembling at Pittsburg, it was deemed expedient to preserve the information thus acquired for future usefulness, embodied in the form of instructions for surveys, and to place them on the records of our transactions as a Board; but not, (on my part,) as expressive of the opinion that it would be of essential importance to execute them all. The line of communication depends upon the command of water, and it is evident there is but one route where it is found in sufficient quantity.

The next division of this illustration of the general subject, is on the co-operation with the Pennsylvania Commissioners, also respectfully submitted.

JNO. L. SULLIVAN,
Member Board Int. Improvement.

Pennsylvania Reconnoissance.

In conformity with the orders of the Secretary of War, the Board of Internal Improvement, in their way to the Eastern states, met and co-operated with the canal commissioners of Pennsylvania in making a reconnoissance of the country from the Ohio to Schuylkill.

To convey a general idea of this route, it is necessary to recal to mind the great features of the country.

At the distance of thirty miles, by the course of the Alleghany, from Pittsburg, the Kiskimanitas, whose upper eastern branch is called the Conemaugh, comes in from the east, that branch heads opposite the Juniatta (itself a branch of the Susquehannah): and, both to the east and west of the Alleghany mountain, are seen others, ranging transversely to these rivers—the Chesnut and Laurel on the west, and many on the east, which divide Pennsylvania into fertile valleys; while farther beyond the Susquehannah, Dauphin, Lancaster, and Chester counties, exhibit a milder aspect of country.

This route naturally divides itself into four sections; 1st, from Pittsburg to the mouth of the Little Conemaugh, computed to be 128 miles; 2d, thence, to the forks of the Juniatta, 40 miles; 3d, thence, to the Susquehannah, 110 miles; 4th, thence, to the Schuylkill, 125 miles. The whole 403 miles.

The first section has favourable ground along the river, on alternate sides, for a large proportion of the distance, presuming the substratum will be found tenacious ground. The principal exceptions are the ravines of Chesnut and Laurel mountains, one five, the other seven miles through. It will often be a question of expediency for skill and calculation, to decide whether to carry the line along the declivity of steep shores, or to cross by an aqueduct to a more favourable ground for a distance, when the same alternative will again present. For this section, which, from its elevation, at the eastern end, gives to the stream the characteristic of a torrent, and precludes improvement of the natural navigation, there will be water in abundance for a canal.

Besides the tributary streams which are considerable, Stony Brook was found to discharge, at Johnstown, at this time, not indeed the lowest state of the river, 239 cubic feet per second, and the Little Conemaugh, near its mouth, 100 cubic feet per second.

The second section includes the Alleghany mountain; and here the question of how much water is in its natural flow at command, or may be had in reserve in the dryest season, becomes an inquiry of the greatest moment: our view was indeed cursory; but, so far as the investigation was carried, may be considered essentially accurate.

One of the Board, Mr. Sullivan, had been accidentally detained half a day at Pittsburg, and crossing the country to fall in with the party, had reached this place before them, and preceded the rest of the company attended by Mr. Livergood, one of the most respectable of the inhabitants of Johnstown. At three miles from this place, up the Little Conemaugh, Hildebrand's mill is situated. The owner, Judge Hildebrand, was asked how the present state of the water compared with its lowest state. His reply was, that in a dry season, such as we had lately had, there was just enough to carry his two grist mills. The measure of his flumes, compared with the result of a measurement of the water as now flowing, would give the minimum and the medium quantities. Each gate was found to be 33 inches wide, its hoist 4½ inches, head of water 3 feet. According to the formula of Du Berat and Dr. Robinson, the quantity discharged is thus found: depth to the centre of gate 3.188 feet; the square root of which being 1.785, which multiplied by 8.02 X (by area) 1.03 X .82 (vena contracta), gives

1,000,000,000

cubic feet 12.093 per second.

12.093 the same for the other gate.

24.186 feet is therefore the minimum quantity.

The race was found to measure at its entrance 7 feet in width, and 2 feet deep, the velocity 10 feet in 80 seconds, which, according to Prony, is

14 feet.

According to Du Berat, 13.56

27.56

2

The mean of which is 13.78 per second.

The discharge over the dam was at this time 3 inches deep, 180 feet in length, which according to the formula given in Robinson's Mechanical Philosophy, is 2.226 X 180 X 12 = 61. = 80.136 ft

Or by another formula, 5.19, the square root of the cube of the depth, X 180 X 12 X 11.50 = 74.600

154.736

2

The mean is 77.368, and plus 13.78, gives present medium quantity 91.148 feet at Hildebrand's mill, which is almost four times the minimum delivery.

The next day the gentlemen who were ascending the river reached Johnstown, and, proceeding

up the Little Conemaugh, measured the stream at the forks, about six miles as the stream runs above the mill.

The south fork was found to certain	43.87 feet
The north fork	59.02
	102.89

The evaporation in the course of that six miles very well accounting for the difference.

The whole party having joined at Ebensburg, excepting Colonel Totten, whose military duties had called him away, we proceeded to measure those streams which are nearest the top of the mountain, or those of them which were most immediatly relied on.

Ben's Creek comes in one mile below Lilly's mill, and the Little Conemaugh was found to deliver immediately below the junction 11.640 feet —at Lilly's mill, 7.098

On the east side of the mountain, Blair's Gap Run,	3.370	
North Brook,	1.873	
	5.243	
Together	10.888	f. per second

The Commissioners had not yet had time and opportunity to investigate the value and local relations of the other streams in this vicinity, as they did at a later period. They state in a letter to the Board, of the 16th November last, that the Beaver Dam branch of the Juniatta, being surveyed, would afford the head waters of Burgoon's Creek, dividing into Kitanning Run, Old Gap Run, Sugar Run, and Blair's Creek, draining the eastern side of the Alleghany for ten or twelve miles. On the west side, the heads of the Little Conemaugh, composed of Trout Run, Laurel Run, Ben's Creek, Limestone Run, Beard Rock Run, M'Closky's Run and Laurel Deep Run, derivable by feeders from the distance of fourteen miles, all of which the commissioners state to be more than forty cubic feet per second; they also describe favorable situations for reservoirs.

Perhaps no branch of practical civil engineering is involved in more difficulty than the calculation and construction of reservoirs and feeders. We have not, on this occasion, that intimate knowledge of the local circumstances ourselves necessary to appreciate or to doubt the persuasion which the commissioners express. While our respect for them, as men of sound judgment, on the one hand, inclines us to believe much may be done on this part of the section; on the other hand, our recollection of the practical difficulties, occasions a degree of doubt and hesitation to concur in the confidence they express.

The length of the tunnel requisite, and the elevation of the ground above the tide, are sufficiently well ascertained; if the summit level, or tunnel, be below the level of Lilly's mill, (and it will be of consequence, as to the supply of water, to place it low,) its length will be 1407 perches, and the line, it is found, will be above Frankstown 910 feet.

Frankstown above Harrisburgh	576
Harrisburgh, below the summit level between Lancaster and Chester,	209
Thence to the side,	519
	2214
The commissioners also state that the descent to the fork of Conemaugh, is	349
And thence to Pittsburg,(759 above tide,)	688
	3251 feet.

The inquiry, how much water a canal requires in situations and seasons exposed to those causes of evaporation and soakage which are active, and, in a degree, uncertain, is answered with no little difficulty, even from experience. Take, for example, the five most complete and noble canal in France, the country whose climate most

resembles our own; and take, also, Erie canal, in its middle and most unexceptionable portion, we find they differ from each other, probably being through a rough country, in some instances, and constructed with more or less precaution. We know of no better rule than the average of these canals viz.

												For evaporation, soakage and lockage.
De Bdare,	6 m. 40f. wide, 4f. deep, sec 128f. uses 62.60 pr. m. pr. min.	69	64	"	73	"	375	"	35 90	"	56.90	69 feet.
Languedoc,		69	47	"	51	"	215	"	55 60	"	13.90	
Do Centre,		89	51	"	54	"	232	"	70.70	"	45.86	
St. Quintin,		32	54	"	54	"	375	"	68 80	"	60.58	
Narbonne,		61	64	"	73	"	375	"	51 90	"	51.90	
Erie,		141	40	"	4	"	136	"	121	"	6.16	
							414				6)343.78	
							69					
							6 pr. m. pr. min. 58.13				{ evap. or soakage.	

But we do not know how much was used in the lockage, except in the instance of Languedoc, on which the average of six years was 1920 boats, its locks being 100 f. 20 f. wide, 8 feet deep = 16000 f X 1920 = 30,720,000 cubic feet ÷ 365 = 841,644 per day, 12 hours is 1169 per minute ÷ 69 miles = 17 feet per mile per minute nearly. Now, assuming that the others have proportional lockage, and that the size of their locks are in proportion to their size, or section, the deduction must be made as above for their lockage, respectively, leaving the nett expense of water for evaporation and filtration; the average of which is seen to be 58.13 per mile per minute; this average is more favorable than the experience of Erie alone, as it has been stated by one of the Engineers on that work, we do not know from what data, or with what correctness, not having had yet an opportunity of personal verification thereof.

That 61 miles from Rochester to Seneca receives		6000 feet.
11 " the Camillus Level,	"	2000 "
69 " the Rome Summit	"	9000 "
141		17000
Or per mile per minute	120	
	.57	

Applying this experience to the second section and the size of the locks in contemplation there, and assuming the summit and adjoining levels to be from the forks of the Conemaugh to the forks of the Juniatta 28 miles, the calculation would stand thus: 28 X 58.82 = 1627.64 per minute per mile, for evaporation and filtration, the locks 80 by 11 by 8 feet -|- 20 (waste) 8448.10 per hour, 84480 per minute 1408 feet. Constantly,

1647 per min. X 60 X 24 X 90 days =		210,942,144
1408 " X 60 X 16 X 90 " =		121,651,200
Cubic feet,		332,593,344

Admitting that the branches of the Little Conemaugh	102.89
And the stream near Lilley's mill	17 could be brought in,
We must reduce them to the minimum of ½ or 30 ft.	
30 X 60 X 24 X 90 amounts to	233,280,000
Showing the quantity by reservoir to be	ft. 99,313,344

One mile square 8 feet deep, with due allowance for evaporation, the feeder being short, would probably be sufficient.

It should not be expected that evaporation will cease during night in tunnels, as the air draws through them, nor that they will be exempt from soakage. The hydrostatic pressure which they are liable to produce on the fissures of rocks, may possibly occasion as much loss of water as they gain by the percolation from above their level; and as the Alleghany falls off very steep towards the east, compared to the declivity of the country west, it will be prudent rather to make their tunnel low than high; though at the expense of its greater length. The commissioners state that the mountain, in many places, exhibits strata of rock in a horizontal position, mixt with clay, which are not unfavourable indications.

Section 3. The country down the valley of the Juniatta continued generally to wear a favourable appearance, unless it be where the mountains range transversely to the course of the river, when the shores rise steep and high, covered with a vast aggregation of the fragments of rock. These, however formidable to the eye, are to be considered rather as masses of rough materials broken up to hand, in readiness for the high and strong walls with which the canal will have to be supported, above reach of the freshets. In this place it would seem an omission not to notice the improvement of the Susquehannah down to the Chesapeake Bay (in progress by the joint exertions of Maryland and Pennsylvania.) The Commissioners, in their report to the Secretary of the Commonwealth of Pennsylvania, express great satisfaction that the Commissioners of both states, "are unanimously of opinion that an ascending navigation is practicable, although there may be some difference of opinion as to the ulterior measures that may be most expedient, and the expense required to accomplish it." The Commissioners have taken considerable pains to form an opinion upon the best ground within their power, of the probable expense of the ascending navigation, at the same time they would have been highly gratified to have had the opinion of a skilful engineer. They have, however, come to the conclusion, that a less sum than two hundred thousand dollars will be sufficient. While it must be a gratification to see the strong probability exhibited in the report of the ultimate success of the improvement of the Susquehannah, giving access from the north to Baltimore, it will be still kept in view that the western trade will be necessarily by canals, in bottoms not adapted to the Chesapeake, and that access to that market from the west, must be more convenient by the Potomac route.

Sec. 4. The Susquehannah, at the junction of the Juniatta, appears to be about half a mile wide, and is full of ledges; the current must, here, at times, be extremely rough, but the only danger to which an aqueduct would be exposed is the same to which bridges on this river are subject, viz: the lodgment and accumulation of ice, and the consequent rise of the water.

The ground from Clark's Ferry to Harrisburg, 14 miles, appeared to be generally level; thence, to Middletown, also favourable. To view the line which the Commissioners had been exploring through Lancaster county, we accompanied them to the villages of Elizabeth, and Manheim, taking

the gauge of the branches of the Chickisalengo, three feet, and our opinion was, that the plan of running one or more feeders to the head branches of the Conestago, of a navigable size, would be both useful and essential.

On this part of the line two alternatives seem to offer in the direct course, either to rise and descend a ridge of land between the Chickisalengo and the Conestago, or pass under it by a tunnel of about one mile. A tunnel is now of such common occurrence in civil engineering, as to oppose no obstacle, if the expense of it is none in comparison with the object of the work; and even the expense and time may be essentially diminished by the employment of steam engine power to raise the earth through shafts opened perpendicularly at different distances for this purpose.

We regretted the wetness of the season had not permitted the Commissioners to remark the lowest state of the water that ever occurs, through this part of the county of Lancaster; we could not, at the time we saw the streams, form a decisive opinion. We crossed the Conestago, near the city of Lancaster, where it runs, as it does in fact, for a long way in a deep bed. The line then led over into the valley of Mill Creek, and afterwards gains the valley of the Pequa; and reaches the ascent to the passage into the county of Chester, in about 14 miles from the city. The ground ascends gradually, for one mile, till it reaches the proposed level of a tunnel under the gap of the mountain about 72 feet below the surface, in conformity with the ground on the south side thereof, and 150 feet above the general level of Lancaster. The supply of water relied on for this part of the canal, is principally that of Buck Run, and the west branch of the Brandywine, with the head waters of the Octorara. The head waters of Pequa, also, on the north side. These streams were all so much more abundant at this time than they are at midsummer, that we did not think their measurement conclusive, though made in some instances. The west branch of the Brandywine was found to deliver (with some allowance for the forge above the spot) 30 feet per second. The east branch of the Brandywine crosses Chester valley, a few miles more to the east, in a deep bed. That valley being well known to extend to the Schuylkill, with very little interruption of ridges of no considerable elevation, had drawn attention at a very early period, as favourable to canal communication. But the Commissioners, in accordance with our own judgment, were decided to reconnoitre a more southern route; as the former necessarily falls in with the line of the Schuylkill navigation, without a legal right to supply from that river, it being already appropriated, we do not know with what limitation, to the works of that incorporation. It would be necessary, perhaps, to cross the Schuylkill to gain near Morristown the old line, began by the late Robert Morris, which entered Philadelphia at the elevation of the highest street in the city. On the other, more southern line, it was thought that a canal might reach the city of Philadelphia at about the same elevation, crossing the Schuylkill by an aqueduct near Gray's Ferry, or more southerly coming into the city, not far from the Navy Yard.

We therefore proceeded down the valley of the West Brandywine to its junction with the main branch near Jeffriesford, where we took the gauge of the stream (53.43) and crossed the ridge of land dividing this river from the west branch of Chester river, which runs generally eastward till it unites with that stream; the line afterwards crosses *Ridleys*, *Crum*, and *Darby* Creeks.

The practicability of this line will depend on leading water from the Brandywine, and our impression of this route was so favourable, as to induce us to suggest to the Commissioners in a letter, the investigations necessary to decide the most material points. Thus the fourth section, except so far as the Susquehannah water may be made use of, appears to depend on streams already much occupied by mills and manufactories. This obstacle is not, however, insurmountable. The vast importance of canals to the whole community, is generally acknowledged. But mills are of great utility: to extinguish them, would be a loss to the community of equal value, and be attended by great inconveniences. Could these great interests be reconciled, which is not improbable, by a method of passing from level to level of a canal, without using near so much water as locks require—and by reserving water for the canal, when, otherwise, the superabundance on the stream would run to waste, Pennsylvania might have the benefits of canal communications without disturbing the mills near their course; but, on the contrary, affording them the facilities and savings attendant on water carriage for the raw material, and from greater distances, and permitting of a greater profit on the manufactured article, a system of peculiar importance to Pennsylvania. On reviewing the whole ground, so far as the facts have been developed, there is scarcely sufficient reason to believe, that the summit level of the Alleghany mountain, and the Lancaster and Chester line, can command water enough for a canal of great capacity.

But it is evident, Pennsylvania has great means and resources for inland navigation, with or without the aid of the General Government; and it is hoped that their co-operation with the commissioners, though so limited in time and extent, will have been of some little use in promoting the public works in contemplation of the state government.

The next division of this communication is on the New Jersey route—also respectfully submitted.

JOHN L. SULLIVAN,
Member of the Board of Internal Impro.

Analysis of the preceding pages.

1st. Or western section up the Kiskiminitas.
2d. Section across the Alleghany mountain.
Calculations of water.
Length of tunnel.
Elevation of ground.
Application of the principle of computation of expense of water on canals.
3d. Section down the valley of the Juniatti
The Susquehannah improved.
4th. Section the Dauphin, Lancaster, and Chester line to Philadelphia.

Reconnoissance in New Jersey.

In pursuance of the orders of the Honorable the Secretary of War, the Board proceeded to meet the canal Commissioners of the state of New Jersey, and viewed the ground contemplated as the route of a canal between the Delaware and the Raritan.

The Board proceeded with them to the examination of the depth of water in the creek at Bordentown, and then to a point on the Delaware, twenty-six miles above Trenton, ascertained to be at an elevation correspondent with the summit level of the canal as proposed to be located to Brunswick.

The length of this feeder must, however, be considerably greater than that distance, as it must several times recede from the river, pass round the valley, and return to be carried along the spurs, which rise steep and rocky, not far from the shore.

The Board, on gauging the mill streams which cross the canal line, were satisfied that a feeder, from the Delaware, would be indispensable to a lock navigation, and to a canal of dimensions correspondent to those which are in process of execution to connect the bays of Delaware and Chesapeake, and the latter with the Albemarle Sound.

The tide of the Raritan is rapid—its channel is crooked: vessels navigating the tide waters will generally be impelled by the wind. To give them access and avoid delay, this canal, if a national work, should be extended as far as possible, and with as low a summit level as may be possible, that the difficulty and extent of the feeder may be less.

In passing through New-Jersey, at a later period, it seemed probable that a direct line between Amboy and Bordentown might be found practicable, with a deeper excavation of the summit; requiring, consequently, a less expensive feeder from the Delaware.

This route might not interfere with the existing project under the authority of the state Legislature, and an opportunity be found of making a canal of the width and depth of the others parallel to the sea-coast.

The Board have already agreed in expressing an opinion that a survey would be useful to determine how far the canal may be extended down along the Raritan. It is further my own conviction, that the ground between South River and the creek at Bordentown, should be investigated, as the shortness of the feeder and favourable ground towards the east, may warrant the reduction of the summit.

The following division of this communication is on the canal routes examined in Massachusetts, also submitted by

JNO. L. SULLIVAN,
Member Board Inter. Impro.

ANALYSIS
OF
THE FOLLOWING ILLUSTRATIONS.
OF THE
MASSACHUSETTS RECONNOISSANCE.

The notoriety of the route.
Description.
Tides.
Plan and execution.
Back River harbor.
Herring Pond.
Former estimate.
Winter.
Sands.
Harbors.
Commercial consideration.
Objects of further investigation.
Barnstable, Hyannis, and Yarmouth.
Narragansett Bay and Boston Harbor communication.
Description.
Considerations on commerce and defence.

The Massachusetts Reconnoissance.

In pursuance of the orders of the Secretary of War to the Board of Internal Improvement, they proceeded to Massachusetts, to make an examination of the grounds between Barnstable and Buzzard's Bays, in accordance with the memorial of the delegates of that state, addressed to the President on the 4th May, 1824, in compliance with a resolve of the Legislature of the 21st January, 1824, strongly representing the national importance of a communication between those waters, and clearly elucidating the valuable effects thereof, both in regard to domestic and foreign commerce and naval operations.

The public attention had been drawn, at an early period, and with greater interest, as the coasting trade increased, both to the narrowness of the Isthmus and the favorable circumstances of the ground. Accurate surveys of it had been made both at public and private expense; and, provided with the maps and reports from the archives of the state, and with the use of others, politely loaned by the proprietors for the occasion, the Board went upon the

(To be Continued.)

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